

From Thesis to Publication: Unveiling the Predictive Factors for Cardiology Research at a North African Faculty of Medicine (Tunisia)

Les Thèses d'exercice en Cardiologie: Quel devenir éditorial ?

أطروحات الممارسة في أمراض القلب: أي مستقبل تحريري؟

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ABSTRACT

Introduction: The benchmark of a medical thesis' success is often its acceptance for publication in an indexed journal.

Aim: To determine the publication rate of practice theses in the field of Cardiology at the Faculty of Medicine of Sousse (FMSo) in Tunisia and to identify predictive factors for successful publication.

Methods: We conducted a descriptive bibliometric analysis of Cardiology theses defended at FMSo from 2000 to 2019. Data were extracted from the theses' cover pages, abstracts, and conclusions. The publication status was ascertained via searches in "MEDLINE", "Scopus", and "Google Scholar". Predictive factors for publication were identified using multivariate analysis with a 90% Confidence Interval (CI).

Results: Of the 111 Cardiology theses defended at FMSo between 2000 and 2019, 36 were published yielding 42 scientific articles (publication rate of 32%). Notably, 86% of these articles were indexed in "MEDLINE" and/or "Scopus". In 79% of cases, doctoral candidates were co-authors of the resultant publications. Publication was significantly influenced by three factors: scientific mentorship by an Assistant or Associate Professor (aOR=3.021; 90%CI: 1.06-10.14; p=0.082), a prospective study design (aOR=2.536; 90%CI: 1.07-6.02; p=0.076), and a satisfactory quality of writing (aOR=2.384; 90%CI: 1.11-5.11; p=0.061).

Conclusion: The publication of Cardiology theses at FMSo was found to be associated with the prospective design of the study and the quality of writing. Thus, it is imperative to enhance the research methodology and scientific communication skills of medical thesis candidates and their mentors to facilitate the transition from academic dissertations to medical articles.

Mesh words: Bibliometrics - Academic dissertation - Schools, Medicine - Medical Writing - Publications-Tunisia

RÉSUMÉ

Introduction: Le succès de la thèse d'exercice en médecine repose sur sa parution dans une revue indexée.

Objectif: Déterminer le taux de publication des dissertations de Cardiologie à la Faculté de médecine de Sousse (FMSo) en Tunisie, et identifier les facteurs prédictifs de leur publication.

Méthodes: Il s'agissait d'une étude bibliométrique descriptive des thèses d'exercice en Cardiologie à la FMSo durant la période 2000-2019. Les données ont été collectées à travers les pages de garde des thèses et leurs conclusions et/ou résumés. Le devenir éditorial des dissertations a été identifié par des requêtes documentaires, dans MEDLINE, Scopus et «Google Scholar». Les facteurs prédictifs de leur publication ont été retenus, suite à une analyse multi variée avec un Intervalle de Confiance (IC) à 90%.

Résultats: Parmi 111 thèses d'exercice en Cardiologie, soutenues à la FMSo entre 2000 et 2019, 36 ont évolué vers la publication de 42 articles scientifiques, soit un taux de publication de 32%. Dans 86% des cas, ces articles ont été indexés, dans les plateformes «MEDLINE» et/ou «Scopus». Dans 79% des cas, les thésards ont été cosignataires des publications issues de leurs dissertations, dont leur publication a été attribué à trois facteurs essentiels: la direction scientifique par un Assistant Hospitalo-Universitaire ou un Maître de Conférences Agrégé (ORa=3,021 [1,06-10,14]; p=0,082), le devis prospectif de l'étude (ORa=2,536 [1,07-6,02]; p=0,076), et sa qualité rédactionnelle satisfaisante (ORa=2,384 [1,11-5,11]; p=0,061).

Conclusion: Le devenir éditorial de la thèse d'exercice en Cardiologie à la FMSo a été corrélé à son schéma d'étude prospectif et à sa qualité rédactionnelle, d'où l'importance du renforcement des capacités des thésards et de leurs encadrants, en méthodologie de recherche et en communication scientifique, facilitant le switch de la dissertation académique à l'article médical.

Mots Clés: Bibliométrie – Dissertation universitaire – Ecoles de médecine – Rédaction médicale – Publication - Tunisie

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المخلص

المقدمة: يعتمد نجاح أطروحة الممارسة في الطب على نشرها في مجلة مُفهرسة. هدفا هذه الدراسة هما تحديد معدل نشر أطروحات طب القلب بكلية الطب بسوسة (تونس)، وتحديد العوامل التي تتنبأ بنشرها.

المنهجية: غطت هذه الدراسة البيبليومترية الوصفية جميع أطروحات الممارسة في الطب، المُنجزَة في مجال طب القلب بكلية الطب بسوسة خلال الفترة 2000-2019. جُمعت البيانات من صفحات الغلاف والخاتمة و/أو الخلاصة للأطروحات. تم التعرف على مال النشر الخاص بالأطروحات من خلال البحث الوثائقي في MEDLINE و Scopus و Google Scholar. حُددت العوامل التنبؤية لنشرها بناءً على تحليل متعدد المتغيرات مع مجال ثقة بنسبة 90%.

النتائج: من بين الـ 111 أطروحة في مجال طب القلب بكلية الطب بسوسة بين عامي 2000 و2019، تطورت 36 أطروحة إلى 42 مقال علمي، وهو ما يمثل نسبة نشر بلغت 32%. فُهرست هذه المقالات في منصتي "MEDLINE" و "Scopus" في 86% من الحالات. في 79% من الحالات، كان الطلاب الباحثون شركاء في نشر المقالات الناتجة عن أطروحاتهم. يُعزى النشر إلى ثلاثة عوامل أساسية: الإشراف العلمي من قبل مساعد جامعي استشفائي أو أستاذ محاضر مبرز (ORa=3,021 [1,06-10,14]; p=0,082)، والتصميم الاستباقي للدراسة (ORa=2,536 [1,07-6,02]; p=0,076)، وحسن الجودة التحريرية (ORa=2,384 [1,11-5,11]; p=0,061).

الخلاصة: ارتبط مال أطروحات الممارسة في مجال طب القلب بكلية الطب بسوسة، من حيث النشر، بالتصميم الاستباقي للدراسة وجودة التحرير، مما يبرز أهمية تعزيز مهارات الباحثين ومشرفيهم في منهجيات البحث والتواصل العلمي، و يسهل تطوير الأطروحة الأكاديمية إلى مقال علمي.

الكلمات المفتاحية: القياسات البيبليومترية - أطروحة دكتوراه جامعية - كليات الطب - الكتابة الطبية - نشر المقالات العلمية - تونس..

INTRODUCTION

The practice thesis in Medicine, recognized as a robust measure of academic performance [1], represents a significant commitment for both students and their scientific mentors within faculties of health sciences [2]. The booming demographics of medical students have resulted in a surge of thesis defenses, paradoxically associated with a shortage of indexed scientific publications [3]. In fact, the number of defended dissertations within medical schools surpasses the number of affiliated publications [4]. This underscores the importance of converting medical theses into scientific articles, particularly within accredited faculties that are striving to integrate into the international university rankings [5,6]. As part of its pursuit of academic excellence, the Faculty of Medicine of Sousse (FMSo) in Tunisia has initiated a strategy to enhance academic dissertations. This strategy involves transitioning from the traditional manuscript format to a draft that aligns with the guidelines of original scientific publications. Such an initiative would serve to valorize the substantial pedagogical investment made by students, supervisors, reviewers, and examiners throughout the various stages of the extensive thesis defense process.

This study, centered on cardiology theses at the FMSo, is a continuation of the initiative instigated by the Inter-Faculty Research Group on the Future of Dissertations (GRIF2D) in health science faculties across the Maghreb region. Utilizing bibliometric data encompassing the thematic spectrum, methodology, and editorial quality of medical theses, a call to action was issued to address the educational wastage stemming from the paradox of an abundance of theses contrasted with a scarcity of publications.

The monitoring of the editorial trajectory of academic dissertations [7] and the identification of predictive factors for their publication in indexed journals provide empirical data to all stakeholders in academic institutions.

This data is crucial for facilitating a significant shift from narrative medical theses to projects resembling original scientific articles.

Building upon research conducted in other disciplines such as Community and Preventive Medicine [6,8] and General Surgery [9–11], this study encompasses all practice theses supervised by Cardiology faculty members over two successive decades at FMSo. Following an examination of the bibliometric profile of Cardiology dissertations, the objectives of this study were to delineate their editorial evolution in terms of indexed articles and to ascertain the predictive factors influencing their scientific publication.

METHODS

This was a cross-sectional bibliometric study of all practice theses in Cardiology defended at FMSo (Tunisia) over twenty years (2000-2019). The data were collected through the library archives (back and front cover, abstract, and conclusion) and the most commonly used electronic document platforms in health sciences (MEDLINE, Scopus, and Google Scholar).

The affiliation of a Cardiology practice thesis was attributed by referring to the specialty of its primary supervisor. Its theme was determined based on the "essential descriptors," among the indexing keywords, which were then grouped into homogeneous categories. The writing quality of the dissertation was evaluated using a 20-item reading grid developed by the LR19SP01 Research Laboratory, following the principles of best practices in medical scientific writing. Scientific medical writing was considered "satisfactory" when the evaluation score was equal to or greater than 75 out of 100 points (Box 1). The fate of the Cardiology practice thesis was studied through a documentary search in the following three databases: MEDLINE via Pubmed platform (<http://www.pubmed.gov/>), Scopus (<http://www.scopus.com/home.url>), and

"Google Scholar" (<http://scholar.google.fr/>). For greater sensitivity, the documentary query for potential derived publication from the cardiology dissertations was based on a combination of potential authors' names (students and/or dissertation supervisors), in addition to keywords of their scientific works.

The data were analyzed using PSPP statistical software. Descriptive statistics were used to summarize qualitative variables (absolute, relative, and cumulative frequencies) and quantitative variables (mean, standard deviation, median, and quartiles). To measure the associations

between the dependent variable (scientific publication of the Cardiology practice thesis) and the explanatory and qualitative independent variables, the Fisher exact test was applied with a statistical significance threshold of 10%. The variables associated with the "scientific publication" of the Cardiology practice thesis, in the univariate study, with a p-value <25%, were introduced into a binary logistic regression model. The crude odds ratio (cOR) and adjusted odds ratio (aOR) were presented with 90% confidence intervals (CI).

Box 1. Evaluation grid for the writing quality of abstracts from Cardiology practice theses, defended between 2000 and 2019 at the Faculty of Medicine of Sousse, Tunisia (*GRIF2D*)

Item for quality of scientific writing (NA: Not Applied)	0.No	1.Yes	2.NA
1 Presence of an abstract	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 The title reflects the content of the study	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 The main results were presented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 Absence of language errors in abstract	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 No abbreviations in the title	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 Title words were fewer than 15 (90 characters)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 Studied population was presented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 Study's objective was clarified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 Conclusion was consistent with the results	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 Sentences were short (less than two lines)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11 The type of study was mentioned	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12 The data collection source was announced	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13 Sentences did not start with numbers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14 All verbs in the results section were in the past tense	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15 The abstract was structured (IMRaC)*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16 No mentions such as (about, study of, contribution to...)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17 Averages were associated with standard deviations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18 No abbreviations in the abstract	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19 Keywords were MeSH terms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20 Confidence intervals were mentioned if sampling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RESULTS

Between 2000 and 2019, a total of 111 theses in Cardiology were successfully defended at the FMSo (Tunisia), and in 57% of cases, they were nominated for the prestigious "thesis prize". The primary descriptors utilized in these dissertations included "Angioplasty", "Myocardial ischemia", "Cardiac failure", and "Atrial fibrillation". Based on these essential descriptors, 12 thematic areas were identified. Among these, three main domains were addressed by 52% of theses: "Ischemic heart diseases" (28%), "Rhythm disorders" (14%), and "Valvular heart diseases" (10%). The research methodology employed in these studies was predominantly "descriptive", accounting for 55% of the dissertations, while the editorial quality was deemed "satisfactory" in 59% of cases (Table 1). Out of the 111 Cardiology practice theses, 36 of them led to the publication of 42 scientific articles. It is noteworthy that six dissertations were transformed into two separate articles each, resulting in an overall publication rate of 32%. Furthermore, 86% of published articles were indexed in MEDLINE and/or Scopus. In 79% of cases, doctoral students were listed as co-authors in publications resulting from their academic dissertations (Table 2).

The scientific journal "La Tunisie Médicale" held the highest ranking, accounting for 44% of the published articles derived from the Cardiology practice theses (Table 3). Upon performing a univariate analysis of the editorial outcome of the Cardiology practice thesis, four factors were identified as being associated with its scientific publication: supervision by an Assistant or an Associate Professor, a theme related to Interventional Cardiology, a prospective study design, as well as satisfactory writing quality. Following adjustment, the multivariate study revealed that supervision by Assistant or Associate Professors (aOR=3.021, 90% CI [1.06-10.14]; p=0.082), a prospective study design (aOR=2.536, 90% CI [1.07-6.02]; p=0.076), and good writing quality (aOR=2.384, 90% CI [1.11-5.11]; p=0.061) were the three independent predictive factors for the publication of a Cardiology practice thesis (Table 4).

Table 1. Bibliometric characteristics of 111 practice theses in Cardiology, defended between 2000 and 2019, at the Faculty of Medicine of Sousse (Tunisia).

	n	%
Thesis Conduct		
One Academic director	68	61.3
Thesis written in French	110	99.1
Nominated for «Thesis Prize»	63	56.8
Essential Descriptor		
Angioplasty	14	12.6
Myocardial ischemia	14	12.6
Heart failure	7	6.3
Atrial fibrillation	7	6.3
Pacemaker	6	5.4
Others (31 descriptors)	63	56.8
Thematic category		
Ischemic heart diseases	31	27.9
Rhythm disorders	16	14.4
Valvular heart diseases	11	9.9
Heart failure	11	9.9
Congenital heart diseases	10	9.0
Cardiovascular risk factors	9	8,1
Carditis	8	7,2
Cardiac explorations	4	3,6
Vascular diseases	4	3,6
Pregnancy and cardiovascular complications	3	2,7
Cardiac masses	2	1,8
Sports cardiology	2	1,8
Study Design		
Descriptive study (>30 cases)	61	55.0
Prospective data collection	21	18.9
Case series (≤30 cases)	16	14.4
Prognostic study	14	12.6
Quality of scientific writing		
Satisfactory	65	58.6
Unsatisfactory	46	41.4

Table 2. Characteristics of 42 articles from 111 practice theses in Cardiology, defended between 2000 and 2019 at the Faculty of Medicine of Sousse (Tunisia).

	n	%
Article language		
French	21	50.0
English	21	50.0
Article indexing		
MEDLINE and/or Scopus	36	85.7
Google Scholar only	6	14.3
Co-authorship by thesis candidates		
1 st or 2 nd position	20	47.6
3 rd or 4 th position	10	23.8
Position >4	3	7.1
Not a Co-author	9	21.5

Tableau 3. Scientific journals publishing 42 articles originated from cardiology practice theses defended between 2000 and 2019 at the Faculty of Medicine of Sousse, Tunisia

Scientific journals	Indexation	n	%
National journals			
		21	50.0
1. <i>La Tunisie Médicale</i>	MEDLINE/Scopus	15	35.7
2. <i>Revue Tunisienne de Cardiologie</i>	Google Scholar	6	14.3
International journals			
		21	50.0
1. Archives of Cardiovascular Diseases Supplements	Scopus	8	19.0
2. <i>Annales de Cardiologie et d'Angéiologie</i>	MEDLINE/Scopus	5	11.9
3. European Heart Journal	MEDLINE/Scopus	3	7.1
4. Pacing and Clinical Electrophysiology	MEDLINE/Scopus	1	2.4
5. <i>Revue Médicale de Bruxelles</i>	Scopus	1	2.4
6. Health Services Research and Managerial Epidemiology	Scopus	1	2.4
7. <i>Annales d'Endocrinologie</i>	MEDLINE/Scopus	1	2.4
8. <i>Médecine de Sommeil</i>	Scopus	1	2.4

Table 4. Predictive factors for the publication of practice theses in Cardiology, defended between 2000 and 2019, at the Faculty of Medicine of Sousse (Tunisia). a. Univariate analysis

	Theses defended (N=111)	Published theses (N=36)	Publication rate %	Crude OR	90% CI	p
Thesis director's grade						
Assistant/Associate Professor	90	33	36.7	3.474	1.17-10.30	0.069
Full professor	21	3	14.3			
Number of thesis directors						
Only one	43	14	32.6	1.009	0.51-2.00	1.000
Two or more	68	22	32.4			
Specialty of the thesis co-director						
Multidisciplinary	7	3	42.9	1.614	0.44-5.94	0.680
Mono-disciplinary	104	33	31.7			
Sex of the doctoral student						
Female	39	15	38.5	1,518	0.76-3.02	0.396
Male	72	21	29.2			
Language of the thesis						
English	1	1	100	3.143	2.39-4.13	0.324
French	110	35	31.8			
Thematic category of the thesis						
Interventional cardiology	35	15	42.9	1.964	0.97-3.97	0.130
Others	76	21	27.6			
Study design						
Prospective	21	10	47.6	2.238	0.99-5.05	0.122
Others	90	26	28.9			
Quality of scientific writing						
Satisfactory	65	26	40.0	2.400	1.17-4.93	0.063
Unsatisfactory	46	10	21.7			

b. Multivariate Analysis

Predictors of Publication	Variable modalities	Multivariate analysis		
		Adjusted OR	90% CI	p
Thematic category	Interventional cardiology	1.737	0.83-3.65	0.221
	Vs. others			
Director's grade	Assistant or Associate Professor	3.287	1.07-10.1	0.082
	Vs. Full Professor			
Study design	Prospective	2.536	1.07-6.02	0.076
	Vs. others			
Writing quality	Satisfactory	2.384	1.11-5.11	0.061
	Vs. not satisfactory			

DISCUSSION

A medical practice thesis serves as the foundation for a scientific publication, ensuring both editorial visibility and academic performance. An unpublished academic dissertation represents a missed opportunity for a scientific article. This bibliometric study, conducted following a series of studies specific to health science specialties and faculties, has not been exempt from common methodological limitations. The editorial potential of these theses has been explored across various documentary sites, thereby reducing the risk of non-coverage should the publication occur in non-indexed journals or those not available online. Given the non-biological nature of this work, the statistical analysis was conducted with an accepted error risk of 10%, a threshold commonly accepted in sociological literature. Despite the modest publication rate of FMSO's practice theses in Cardiology, the transformation of an academic dissertation into a scientific article was found to be influenced by three predictive factors: the supervisor's grade, the prospective design of the study, and the high editorial quality of the dissertation. These factors highlight the importance of mentorship, study design, and editorial skills in the successful publication of academic work.

Publication of practice theses in Cardiology

The publication rate of Cardiology practice theses at FMSO, while modest, was three times higher than the combined rate of all other specialties within the same faculty [12] and exceeded rates at other national medical schools [2,13,14]. Internationally, this rate was comparable to those reported in France (35%) [15] and Croatia (34%) [16], but was significantly lower than the 72% rate reported at a Portuguese university [17]. The successful transformation of academic dissertations into scientific articles has been achieved in several countries, such as Denmark, where it reached 92% at the Faculty of Medical and Health Sciences [18]. However, this pedagogical shift faces several challenges, including a lack of medical writing and scientific publication skills among medical students, and an increased workload for supervisors juggling care and teaching responsibilities. Aligning with the accreditation strategy, this shift could facilitate the integration of universities into international rankings, such as the ARWU, which are based on two major criteria: productivity in scientific publications and

their international visibility [19]. Therefore, it is crucial to adopt a proactive approach from the beginning of the practice thesis registration process, treating it as a potentially publishable scientific article [20].

The national publication was the preferred outlet for articles originating from Cardiology practice theses at FMSO, particularly in the journal *"La Tunisie Médicale"*, which ranked first among journals requested for the publication of Tunisian scientific medical literature (62%) [6,21,22]. This trend was also observed in other countries, such as Turkey [23], where half of the scientific articles produced between 1970 and 2016 were published in national journals. This editorial practice reflects the commitment of healthcare professionals to address the specific needs of their populations and the societal responsibility of academic institutions in tackling national health challenges. However, it is also important to consider the challenge of global visibility of national research, encouraging researchers to expand their influence on the international scientific community. Articles from Cardiology practice theses at FMSO were sometimes published in non-indexed journals in the MEDLINE and/or Scopus databases (14%), a rate lower than that found in the same faculty (41%), across all specialties [12]. Despite the willingness of young researchers to publish in non-indexed journals, supported by specialized scientific societies, such a practice could compromise the academic recognition of researchers' performance and their universities.

Although only 20% of articles derived from theses are not co-authored by the corresponding doctoral students, it is essential to regulate this practice through a formal thesis guide. Ensuring that each article is co-signed by the students who contributed to its development is not only an ethical obligation but also a crucial standard for maintaining scientific integrity in academic research.

Predictive factors for the publication of practice theses in Cardiology

In this study, three factors were independently associated with the publication of clinical theses in Cardiology at the FMSO: the academic rank of the thesis supervisor, the prospective methodological design of the study, and its good editorial quality.

Supervisor's academic grade

The supervision of a clinical thesis in Cardiology by an Assistant or Associate Professor increased its likelihood

of publication threefold compared to those supervised by a Full Professor. This factor has been identified in several other studies [24]. This could be attributed to the heightened motivation of early-career faculty members preparing for their academic advancement (including contests for associate professorship and professorship). These supervisors would guide their students toward high-quality research to be further published as scientific articles in prestigious journals.

Prospective Study Design

Our study found that adopting a prospective study design increased the probability of its publication by 2.5 times, corroborating findings from Turkish [25] and French [15] studies. This finding has already been described as a predictive factor for the publication of oral communications presented at scientific conferences [26]. The inherent requirements of prospective studies, such as the need for substantial funding and ethical committee approval, suggest that these research projects would often be methodologically robust, making them potentially more attractive for publication. Supervisors, aware of these criteria, would be more invested in the planning, execution, and publication of these works.

Satisfactory writing quality

According to our study, a Cardiology thesis with satisfactory writing quality had 2.3 times more chances of being published. This association has been documented in other bibliometric studies in Tunisia [8,12] and worldwide [27,28]. According to Huguier-Maisonneuve et al. [29], non-compliance with writing principles and rules often leads to article rejection "even before being submitted to the editorial board." Therefore, to optimize the chances of publication for medical theses, it is imperative to implement programs that develop medical students' skills in research methodology, biostatistics, and scientific writing [30,31].

Dissertation valorization strategy

In conclusion, this study underscores the critical importance of embracing a comprehensive strategic approach to enhance the value of dissertations in Cardiology at FMSo (**Box 2**). Firstly, it is essential to establish periodic meetings within hospital departments dedicated to supervising practice theses and training interns in Scientific Writing. The multidisciplinary nature of research projects opens doors to innovations and the development of integrated algorithms for medical decision-making, grounded in evidence-based data. Additionally, scientific medical writing in English facilitates wider dissemination of research findings, thereby enhancing the international impact of work conducted at FMSo and in all national, Maghreb, and African health science faculties. Another important measure is to define "community-based" research themes specifically allocated to Family Medicine residents. This would not only enrich the diversity of topics addressed but also strengthen the link between scientific research and community needs, thereby increasing the relevance

and applicability of results [32]. Encouraging doctoral candidates to undertake synthetic literature reviews is also of great importance. Such work, whether in the form of systematic reviews or meta-analyses, contributes to enhancing research quality by providing a rigorous synthesis of existing knowledge. Simultaneously, strengthening the skills of practice thesis stakeholders, namely scientific directors and doctoral candidates, is indispensable. Regular training in research methodology and scientific medical writing would be necessary to maintain a high level of quality in research production. Moreover, awarding the highest distinction to practice theses crowned with publications, with reimbursement of Article Processing Charge (APC) fees, would partially valorize these works and motivate young researchers to transcend their academic careers for greater visibility and impact. Furthermore, promoting Evidence-Based Medicine, diversifying research methodologies, raising awareness of the importance of prospective studies, and evaluating practice theses considering methodology, writing quality, and publication potential are all crucial aspects to ensure excellence in scientific research in Cardiology at FMSo. Also, guiding researchers towards the choice of indexed and high-impact journals for publishing their scientific work ensures optimal dissemination of produced knowledge. This contributes to positioning FMSo's practice thesis works in influential research forums, thereby enhancing the institution's reputation. Thus, practice theses in Cardiology represent an opportunity for skills enhancement, both for doctoral students and their supervisors in health research methodology and scientific medical writing, contributing to the excellence of healthcare professionals, the performance of their hospital services and universities, and the improvement of the overall population health. Designed, conducted, and written in accordance with current international recommendations, the practice thesis in Cardiology, as in all health science disciplines, is a "gestating" scientific article project, whose non-publication would be an inevitable "editorial abortion" and a waste of scientific documents, resulting in a lack of visibility of national research, scientific researcher recognition, and accreditation of the performance of their hospitals and universities. The immediate and structural transformation of the thesis in Cardiology, as well as academic dissertations (across all specialties), is not only a pedagogical and managerial necessity but also a scientific and ethical urgency. "Now more than ever," the exercise thesis in Cardiology is a "draft" of a publishable scientific article in an indexed and high-impact journal, a mission to be ensured by authors, supervisors, reviewers, and editors, following good editorial practices accumulated over more than two centuries.

Box 2. Roadmap for the valorization of practice theses in Cardiology at the Faculty of Medicine, Sousse (Tunisia)

1. **Annual Planning:** Develop an annual repository of topics for academic dissertations in Cardiology, classified according to their themes and study designs. This should be tailored to the specialty of the residents (“Family Medicine”/“Cardiology”), with an average of two practice thesis projects per year for each senior in the specialty.
2. **Progress Monitoring:** Establish a periodic staff meeting within hospital services dedicated to monitoring the progress of practice theses in Cardiology. This meeting will focus on the advancement of academic dissertations, covering aspects such as bibliography, research protocol, statistical analysis, scientific writing, and defense preparation.
3. **Adherence to IMRaD Structure:** Adopt the structure of the original scientific article, encapsulated by the acronym IMRaD (Introduction, Methods, Results, and Discussion), for the composition of the academic thesis in Cardiology.
4. **Promotion of High-Level Evidence Studies:** Encourage Cardiology students to gravitate toward study designs that provide high-level evidence. These include multicenter, analytical, experimental, and synthetic studies.
5. **Interdisciplinary Collaboration:** Foster interdisciplinary collaboration between Cardiology researchers and those in related clinical specialties, as well as with fundamental, community, and social disciplines.
6. **Language Preference:** Advocate for the writing of dissertations in Cardiology in English, particularly for research subjects. French should still be acceptable for didactic dissertation projects, while Arabic is preferred if the target audience of the practice thesis is the “General Public”.
7. **Publication Requirement:** Mandate the submission of a manuscript version of the academic dissertation in Cardiology. This should be limited only to practice theses that have been previously submitted for publication in journals indexed in high-ranking databases (Q1-Q3). This is a prerequisite for the potential awarding of the “Thesis Prize” commendation.

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